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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/913,518	04/06/2004	JEAN-PAUL DEBALME	1247-709-3VF	7024
22850	7590	05/20/2004	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			AFTERGUT, JEFF H	
			ART UNIT	PAPER NUMBER
			1733	

DATE MAILED: 05/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

08/913,518

Applicant(s)

DEBALME ET AL.

Examiner

Jeff H. Aftergut

Art Unit

1733

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 5-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 5-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 1 and 5-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Connor in view of either one of E.P. 630,735 (newly cited) or Japanese Patent 4-201412 (newly cited) further taken with either one of Schermutzki (newly cited) or U.K. 2,040,801 (newly cited) and optionally further taken with Francis, Jr.

O'Connor suggested that it was known at the time the invention was made to form plural fabric layers from commingled thermoplastic and reinforcing fibers wherein the reinforcing fibers included glass fibers, see column 3, lines 19-31 for the reinforcements employed and column 5, lines 10-23 for the use of plural plies of fabric which were simultaneously consolidated into the composite. The reference suggested that the various techniques for forming the fabrics included the incorporation of various techniques for making the fabrics including forming a nonwoven fabric from chopped fibers of the commingled filaments (column 3, lines 42-52 as well as simply weaving or knitting a fabric from the commingled threads, column 3, lines 34-42. Additionally, the reference suggested that plural fabric layers would have been stacked up and exposed to heat and pressure for an adequate amount of time so as to allow any air in the assembly to escape, see column 4, lines 32-35. The reference suggested that those skilled in the art would have assembled plural layers together and applied heat and pressure followed by cooling the assembly in order to form a composite article where the plies assembled together could be all nonwoven fabric plies or all woven fabric plies, see column 4, lines 5-43. The reference suggested that the critical component in the operation was the intimate contact

Art Unit: 1733

between the thermoplastic fibers which later formed the matrix and the glass reinforcement used in the composite. The reference was silent as to the use of a conveyor for feeding the material through the operation as well as the specific formation of a "void free" laminate (it should be noted regarding the formation of a void free laminate that the reference suggested that those skilled in the art would have allowed any entrapped air in the fabric assemblies to escape during the application of heat and pressure as discussed above and as such it was clearly the intent of O'Connor to produce a "void free" composite as entrapped air is what causes voids in the assembly).

Regarding the production of a void free composite article from the commingled fabric assemblies of O'Connor, the applicant is advised that those skilled in the art at the time the invention was made would have understood that the commingled fiber assemblies would have been subjected to heat and pressure followed by cooling for an adequate amount of time in the processing to allow entrapped air to escape and yield a void free product as evidenced by any one of E.P. 630,735 or Japanese Patent 4-201412. More specifically, E.P. '735 produced a commingled thermoplastic fiber which formed a matrix and a second higher melting point fiber which formed the reinforcement wherein the assembled fibers were formed into various fabrics including woven and needled nonwovens and stacked together. After the stacking operation, the assembled layers were subjected to heat and pressure followed by cooling whereby a void free product resulted, see column 4, lines 2-37, column 6, line 53-column 7, line 3, column 7, lines 31-38, column 7, line 51-column 8, line 8, column 8, lines 32-43, column 9, lines 14-16, and column 9, lines 29-36 where the reference expressly stated that the finished assembly was "free from voids". Japanese Patent '412 suggested that those skilled in the art at the time the invention

Art Unit: 1733

was made would have blended thermoplastic fibers and reinforcing fibers to form a tow which was suitable for weaving into a composite fabric material. The reference suggested that with proper application of heat and pressure for a predetermined duration of time one skilled in the art would have produced a void free composite article, see the abstract of the disclosure of the document which clearly expressed that the so formed assembly was "substantially void free" and that it was known to form the woven fabric with matrix fibers of thermoplastic. Clearly, one skilled in the art of making the composite of O'Connor would have understood that exclusion of entrapped air in the assembly would have resulted in a finished assembly which was void free and that those skilled in the art would have desired a void free composite from the thermoplastic fiber and reinforcing fiber composite materials as evidenced additionally by either one of E.P. 630,735 or Japanese Patent 4-201412. The combination failed to suggest that those skilled in the art would have applied the fabric assemblies upon a conveyor in the operation of forming the composite assembly.

However, those skilled in the art of forming a composite laminate from plural fabric layers (two nonwoven layers for example) would have readily appreciated that the assembly would have been fed through a zone where heat and pressure were applied followed by cooling of the assembly below the melting point of the thermoplastic while maintaining the pressure as suggested by either one of Schermutzki or U.K. 2,040,801. It should be noted that the reference to Schermutzki suggested that one skilled in the art would have applied heat and pressure with a double band press arrangement whereby the resulting assembly was a void free composite article, see column 2, lines 53-58, column 2, lines 63-68, column 6, lines 40-43, Figure 3 where mats (nonwovens) of glass fibers 4 and 4a are joined into the composite in the double band press

Art Unit: 1733

arrangement described therein. Clearly, continuous manufacture of a composite laminate which was void free and formed from thermoplastic matrix material would have included application of heat and pressure as well as cooling under pressure in a conveying arrangement which included a double band press assembly such as that of Schermutzki (note that those skilled in the art would have understood the need for applying heat and pressure followed by cooling while maintaining pressure in O'Connor and the reference to Schermutzki suggested a suitable means for processing the composite material to achieve a product which avoided air entrapment and yielded a void free composite). U.K. '801 suggested that it was known to consolidate two nonwoven mats with thermoplastic matrix resin in a continuous manner in a press arrangement which included a double band press in order to facilitate application of the pressure and heat followed by cooling while maintaining the pressure on the material. Clearly, as depicted in Figure 1, the mat was disposed upon a conveyor and a second mat layer was placed thereon and the assembly subjected to consolidation under heat and pressure with the double band press. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the double band press arrangements of either one of U.K. 2,040,801 or Schermutzki wherein a void free composite would have been manufactured with appropriate use of heat and pressure during consolidation as evidenced by either one of E.P. 630,735 or Japanese Patent 4-201412 in the processing for manufacturing a fiber reinforced thermoplastic composite from reinforcing fibers and thermoplastic matrix fibers as suggested by O'Connor.

It should be noted that O'Connor suggested that the amount of reinforcing material in the finished composite article included 40-80% of the total weight of the composite material, see column 3, line 64-column 4, line 3. Regarding claim 1, additionally note that the "strip of fabric"

Art Unit: 1733

formed in the claim does not require anything more than the formation of a nonwoven fabric (i.e. it does not specify whether a woven or nonwoven fabric makes up the "strip of fabric).

Additionally note that both of U.K. 801 and Schermutzki suggested that those skilled in the art at the time the invention was made would have supported the fabric on a conveyor during the consolidation operation wherein the conveyor mechanism was part of a double band press.

Regarding claim 5, note that the reference to O'Connor suggested that one skilled in the art would have known to utilize chopped fiber for forming the layers of fabric. Regarding claim 6, the reference to O'Connor suggested that one skilled in the art would have additionally known to utilize fabrics which were woven, for example as the composite fabrics processed with heat and pressure. Regarding claim 7, the prior art set forth above suggested that one skilled in the art would have pressed the material with a double band press on both sides of the layers to consolidate the same. Regarding claims 8-10, the reference to O'Connor suggested that multiple layers (2-10) plies of the fabric were laid up and consolidated to form the finished assembly. The reference additionally suggested that nonwoven fabrics as well as woven fabrics would have been suitable for such processing. The specific number of plies selected and the types of fabrics utilized were clearly driven by the nature of the desired finished assembly and the strength requirements of the same (i.e. woven fabrics would provide strength in the direction that the fibers were disposed while non-woven fabrics would have provided reinforcement in various random directions but with short fibers which were less strong than continuous length fibers). The particular number and sequence of the lay up would have been determined through routine experimentation and was within the purview of the ordinary artisan. Regarding claims 13 and 14, the applicant is advised that the combination suggested that chopped fibers would have been

Art Unit: 1733

useful for forming the fabrics (see O'Connor) and additionally that one skilled in the art would have preheated the materials prior to introduction into the double band press as suggested by Schermutzki (see column4, lines 50-55, Figure 3, heaters 12, 12a). The applicant is additionally advised that the use of fabric plies in the assembly was suggested by O'Connor and to supply the same from a spool of the fabric is taken as conventional in the art.

While the claimed invention is deemed to have been suggested by the combination as presented above, the reference to Francis, Jr. is cited to show that: (1) the use of a supply of fabric from a spool or reel of material would have been known to those skilled in the art of composite article manufacture wherein such materials included potentially adhesive fibers (meltable matrix material in the form of fibers) in a double band press arrangement, and; (2) the feeding of both a nonwoven fabric and a woven fabric strip to a press mechanism in the formation of a composite article (where the press was a double band press) would have been within the purview of the ordinary artisan dependent upon the desired finished composite one wished to make. Francis suggested both of these features, see woven fabric supplies 2a and 45 and note that various woven fabric/nonwoven fabric arrangements were proposed for feeding to the consolidating double band assembly as depicted in Figures 3-5. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the fabrics to the assembly device from spools as well as to incorporate both woven and nonwoven fabric plies in the assembly (as a function of the desired properties in the finished assembly) as suggested by Francis, Jr. in the process and device for making a void free composite taught by the combination of either one of U.K. 2,040,801 or Schermutzki wherein a void free composite would have been manufactured with appropriate use of heat and pressure during consolidation as evidenced by

Art Unit: 1733

either one of E.P. 630,735 or Japanese Patent 4-201412 in the processing for manufacturing a fiber reinforced thermoplastic composite from reinforcing fibers and thermoplastic matrix fibers as suggested by O'Connor.

Response to Arguments

3. Applicant's arguments with respect to claims 1 and 5-14 have been considered but are moot in view of the new ground(s) of rejection.

The reference to Francis has been removed as the starting point for the prior art rejection. While the reference suggested that one skilled in the art at the time the invention was made would have utilized a double band press to form the composite assembly, there is no evidence that one skilled in the art at the time the invention was made would have employed a different heating and/or cooling mechanism such that the double band press formed a finished composite assembly which was void free (the use of forced air to heat and cool the assembly appears to suggest the necessity for voids in the finished assembly). It should be noted that the degree of compaction in Francis was expressed as to be that desired to fabricate any condition and final density. Francis is now cited to support the position that those skilled in the art at the time the invention was made would have understood that both a woven fabric ply and a nonwoven fabric ply would have been assembled together into a composite article (as suggested by O'Connor) and the particular mechanisms which would have been useful for this arrangement.

It should be noted that O'Connor inferred that the finished assembly was void free. The references to either one of E.P. 630,735 or Japanese Patent 4-201412 suggested that the finished composite made with the requisite heat and pressure application would have indeed been void free.

Art Unit: 1733

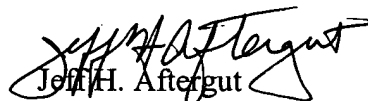
It should be noted that the new matter rejection has been removed, as applicant's petition to alter the specification with a correct translation has been accepted. Additionally, a new filing receipt will be forthcoming. Note that the new filing date on the receipt will read April 6, 2004. Additionally, note that while this is the filing date of this application as of April 6, 2004, the application is nonetheless being treated as a 371 national stage application of PCT/FR97/00101 and it is as if the application was filed in the United States the day the application was filed with the International Search Authority (January 17, 1997). The foreign priority document is not available as prior art nor are any intervening references with dates after January 17, 1997.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff H. Aftergut whose telephone number is 571-272-1212. The examiner can normally be reached on Monday-Friday 7:15-345 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on 571-272-1226. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jeff H. Aftergut

Application/Control Number: 08/913,518

Page 10

Art Unit: 1733

Primary Examiner
Art Unit 1733

JHA
May 4, 2004